

**PERMANENT DOWNHOLE, WIRELESS, TWO-WAY TELEMETRY  
BACKBONE USING REDUNDANT REPEATERS**

5 **ABSTRACT**

A system and method of communicating among devices via a piping structure using at least one induction choke about the piping structure to route a time-varying current carrying communication signals between the  
10 devices. A communications system comprises a piping structure, a first communication device, a second communication device, and an induction choke. The piping structure comprises a first location, a second location, and an electrically conductive portion extending between  
15 the first and second locations. The first and second locations are distally spaced along the piping structure. The first and second communication devices are each electrically connected to the electrically conductive portion of the piping structure along the first location  
20 and second location, respectively, and each is adapted to send and receive communication signals via time-varying current. The induction choke is located about an electrically choked portion of the electrically conductive portion of the piping structure, such that the  
25 induction choke is adapted to route time-varying current within the piping structure between the electrical connection location for the first communication device and the electrical connection location for the second communication device, and such that the first  
30 communication device can communicate with the second communication device via the piping structure. A preferred application of the present invention is a well for producing petroleum products (e.g., oil, natural gas), comprising a communication system as described  
35 above.